



**PRESSURE VESSEL
VISUAL INSPECTION
REPORT**

Report #: **156960-MD-08**
 Inspect Date: 10/16/2012
 Page: 1 of 14
 Insp. Co. Job #: 156960

Criticality Designation:



Yellow

Insp. Comp: Matrix_Inspection District: Grande Prairie - North Field: Chincaga
 Location: 01-24-096-05W6 Unit / Skid #: N/A LSD: 01-24-096-05W6
 Jurisdiction #: A0146858 Equip Tag #: V-301B Serial #: 79-087-05B
 CRN #: D 3193.2 Nat'l Bd #: N/A Year Built: 1979
 Manufacturer: KML Manufacturing Inc. Equipment Description: Other: Gas Dehydrator
 Status: Out of Service - 888 - Equip. Type: Vessel: Tower Service: Sweet
 MAWP Shell: 8619 kPa @ 343 °C Volume: N/A Code Stamp: Y N
 MAWP Tube: @ Height/Length: 8992 mm Insulated: Y N
 MDMT: -20 °F RT: RT-1 Size/Diameter.: 1677 mm I.D. PWHT: Y N
 Support: Skirt Vessel on Original CNRL Inventory List: Y N Manway: Y N
 C.A.: 1.58 mm Coated: N/A Clad: N/A J.E.: 1.00 Remote Access: -

| Component | Material | Nominal Thk | Diameter | OD/ID | Tube Side | Shell Side |
|-----------------|-----------|-------------|-------------|-------|--------------------------|-------------------------------------|
| 1 Main - Shell | SA-516-70 | 88.500 mm | 1677.000 mm | ID | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2 Top - Head | SA-516-70 | 69.270 mm | 1677.000 mm | ID | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3 Bottom - Head | SA-516-70 | 69.270 mm | 1677.000 mm | ID | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4 - | | | | | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 - | | | | | <input type="checkbox"/> | <input type="checkbox"/> |

Static Data: Confirmed Changed (See Comments)

Comments:

Static data confirmed
 Maximum Design Pressure: 9481 kPa

PSV Static Data

PSV -1 Tag #: N/A Serial #: N/A CRN: N/A
 Model #: N/A Capacity: N/A Set Pressure: N/A
 Manufacturer: N/A Service Company: N/A
 Inlet Size & Type: - Last Service Date: N/A
 Outlet Size & Type: - Block Valve: - -
 Carseal Intact: N/A Code Stamp: _____
 Shell Side / Tube Side: _____ Out for Service During Insp.: _____ Location of PSV: _____

PSV -2 Tag #: _____ Serial #: _____ CRN: _____
 Model #: _____ Capacity: _____ Set Pressure: _____
 Manufacturer: _____ Service Company: _____
 Inlet Size & Type: - Last Service Date: _____
 Outlet Size & Type: - Block Valve: - -
 Carseal Intact: _____ Code Stamp: _____
 Shell Side / Tube Side: _____ Out for Service During Insp.: _____ Location of PSV: _____

PSV Comments

Not applicable



**PRESSURE VESSEL
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Report #: **156960-MD-08**
 Inspect Date: 10/16/2012
 Page: 2 of 14
 Insp. Co. Job #: 156960

Insp. Company: Matrix_Inspection LSD: 01-24-096-05W6 Jurisdiction #: A0146858

External Inspection Results – VE External Inspection Performed

| Item | N/A | Condition | Comment (Check Status Bar or Press F1 for Help) | NCR | Action Item Integrity | Action Item Maintenance |
|-------------------------|-------------------------------------|-----------|---|--------------------------|--------------------------|-------------------------------------|
| Nameplate | <input type="checkbox"/> | Accept | Legible and one broken rivet | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Foundation and Supports | <input type="checkbox"/> | Accept | Welded skirt anchored to skid | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Anchor Bolts | <input type="checkbox"/> | Accept | Secure with minor surface corrosion | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grounding | <input type="checkbox"/> | Accept | Grounded directly to North side of skirt | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Insulation Condition | <input type="checkbox"/> | Reject | Moss growth & damaged on 8" inlet elbow | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| PSV | <input checked="" type="checkbox"/> | | Not applicable | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Shell Heads & Nozzles | <input type="checkbox"/> | Accept | Minor surface corrosion through out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Metal Surfaces (Paint) | <input type="checkbox"/> | Accept | Chipped and flaking exposing base metal | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Aux Equipment | <input checked="" type="checkbox"/> | | Not applicable | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Cathodic Protection | <input checked="" type="checkbox"/> | | No external anode | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Alignment | <input type="checkbox"/> | Accept | Vertical and upright | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Flange Connections | <input type="checkbox"/> | Accept | Adequate thread engagement and hardware | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Pressure Gauge | <input checked="" type="checkbox"/> | | No pressure gauge | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Temperature Gauge | <input type="checkbox"/> | Reject | 2 temp gauges not within the range | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Sight Glass | <input checked="" type="checkbox"/> | | No sight glass | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Ladder / Platform | <input type="checkbox"/> | Accept | 2 platforms are secure with cages for ladder | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Leaks | <input type="checkbox"/> | No | No evidence of leaks | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Piping from Vessel | <input type="checkbox"/> | Accept | Riser saddle and lug supports for associated piping | | | |
| Previous UT Survey | <input type="checkbox"/> | Yes | Locations marked, no history provided | UT Company: N/A | | |

External Visual Observations

At the time of inspection the dehydrator was not in service and the vessel is tagged out of service
 The nameplate has one broken rivet
 The coating is flaking and chipped throughout exposing the base metal to minor surface corrosion with no evidence of pitting.

There are two 24" manways on the vessel. The East side manway, hardware and davit arm are in acceptable condition
 The top head davit arm and pin have been removed

The 0-300 C temperature gauges are not within design temp range and the 0-500 C gauge needle is at the 500 C mark

All platforms and ladders are secure with well supported cages on the ladders
 There is moss growth on the top 8" inlet piping cladding interface
 The outlet piping has a small section of cladding/insulation removed, the insulation is exposed, discolored and deteriorating which may result in CUI to the piping system
 The top platform support beam is bent on the West side
 There is mechanical damage noted thru out the surfaces on the shells, (it appears as a tooling marks from erection)
 There is also mechanical damage on the top head below the paint

A UT corrosion survey was performed at the time of inspection with no significant wall losses recorded.

Recommendations:

Remove/ replace insulation on piping
 Replace nameplate rivet
 Remove the moss and treat the area
 Replace temp gauges if temperature exceeds gauge rating
 Clean and touch up the coating to aid in the protection against corrosion

If this vessel is to be moved and/or placed into service the lifting lugs and top nozzle should be MT examined as well as ABSA document AB-10 completed



**PRESSURE VESSEL
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Report #: **156960-MD-08**
 Inspect Date: 10/16/2012
 Page: 3 of 14
 Insp. Co. Job #: 156960

Insp. Company: Matrix_Inspection LSD: 01-24-096-05W6 Jurisdiction #: A0146858

Internal Inspection Results – VI N/A (Not Applicable)

| Item | N/A | Condition | Comment (Check Status Bar or Press F1 for Help) | NCR | Action Item Integrity | Action Item Maintenance |
|------------------|-------------------------------------|-----------|--|--------------------------|--------------------------|--------------------------|
| Shell | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Heads | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Manway | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Gasket Surfaces | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Welds | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Refractory | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Heating Coils | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Demister Pad | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vane Pack | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Baffles | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Trays | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Filter | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Internal Coating | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Tubesheet | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Tube Bundle | <input checked="" type="checkbox"/> | | No Internal Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Internal Visual Observations

No Internal Inspection Carried Out

Recommendations:

No Internal Inspection Carried Out



**PRESSURE VESSEL
VISUAL INSPECTION
REPORT**

Report #: **156960-MD-08**
 Inspect Date: 10/16/2012
 Page: 4 of 14
 Insp. Co. Job #: 156960

Insp. Company: Matrix_Inspection LSD: 01-24-096-05W6 Jurisdiction #: A0146858

Firetube Static Data N/A (Not Applicable)

Diameter: Not Applicable Nom Thickness: Not Applicable Bend: Not Applicable
 Length: Not Applicable Firetube Description: Not Applicable

Firetube NDE Performed: UT Report#: Not Applicable ET Report#: Not Applicable
 MT Report#: Not Applicable RT Report#: Not Applicable
 PT Report#: Not Applicable Other Report#: Not Applicable

Firetube Inspection Results

| Item | N/A | Condition | Comment (Check Status Bar or Press F1 for Help) | NCR | Action Item Integrity | Action Item Maintenance |
|-----------------|-------------------------------------|-----------|--|--------------------------|--------------------------|--------------------------|
| Burner | <input checked="" type="checkbox"/> | | No Firetube Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Stack | <input checked="" type="checkbox"/> | | No Firetube Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Flange (Throat) | <input checked="" type="checkbox"/> | | No Firetube Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Tube Sheet | <input checked="" type="checkbox"/> | | No Firetube Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hot Side | <input checked="" type="checkbox"/> | | No Firetube Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Miter | <input checked="" type="checkbox"/> | | No Firetube Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Return Bend | <input checked="" type="checkbox"/> | | No Firetube Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Supports | <input checked="" type="checkbox"/> | | No Firetube Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Butt Welds | <input checked="" type="checkbox"/> | | No Firetube Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fillet Welds | <input checked="" type="checkbox"/> | | No Firetube Inspection Carried Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Firetube Visual Observations

No Firetube Inspection Carried Out

Recommendations:

No Firetube Inspection Carried Out



PRESSURE VESSEL
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REPORT

Report #: **156960-MD-08**
Inspect Date: 10/16/2012
Page: 5 of 14
Insp. Co. Job #: 156960

Insp. Company: Matrix_Inspection LSD: 01-24-096-05W6 Jurisdiction #: A0146858

Vessel NDE and Final Summary:

UT Report#: _____ ET Report#: _____
NDE Performed: MT Report#: _____ RT Report#: _____
PT Report#: _____ Other Report#: _____

Maxi-Trak Observations Summary (Summarize inspection results Max 255 Characters):

Coating deteriorated exposing base metal to surface corrosion
PSV past due for service and discharge piping is disconnected
Moss growth on the 8" inlet cladding interface
2 temperature gauges not within range Broken rivet on nameplate

Maxi-Trak Recommendations Summary (Summarize Recommendations Max 255 Characters):

Secure PSV piping and service or replace
Remove moss and treat area Replace nameplate rivet
Clean and touch up the coating to aid in the protection against corrosion
Replace temperature gauges if temperature exceeds gauge rating

Actions Corrected at Time of Inspection: (If actions were corrected at the time of inspection – note the corrected actions here.)

No actions were corrected at the time of inspection

Additional Visual Observations

No additional

Any other safety concerns or observations from associated equipment: (for example associated piping, buildings, pumps etc...)

No safety concerns noted at the time of inspection



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VISUAL INSPECTION
REPORT**

Report #: **156960-MD-08**
 Inspect Date: 10/16/2012
 Page: 6 of 14
 Insp. Co. Job #: 156960

Insp. Company: Matrix_Inspection LSD: 01-24-096-05W6 Jurisdiction #: A0146858

Thickness and Remaining Life Evaluation “ Must be Completed ”

MUST BE COMPLETED AND RESOLVED WITH CNRL IMMEDIATELY UPON DISCOVERY OF LOW WALL THICKNESS AREAS

Step 1: Was any thickness measurement location found to be less than (Nominal WT – Corrosion Allowance)?: **No**

If YES, proceed to Step 2; if NO, proceed to “Crack Evaluation” and “CNRL Criticality Designation”.

Step 2: Which component(s) were found below (Nominal WT – Corrosion Allowance)?

Components found below Nom - CA:

| Components |
|-----------------------|
| Top - Inlet Nozzle |
| Top - Head |
| - Shell |
| Bottom - Head |
| Bottom - Drain Nozzle |

Perform Steps 3 – 8 for each component with actual thickness less than (Nominal WT – Corrosion Allowance).

Step 3: Describe Location and Extent of Corrosion:

| Components | Location and Extent of Corrosion |
|------------|------------------------------------|
| N/A - N/A | Not Applicable for this Inspection |
| N/A - N/A | Not Applicable for this Inspection |
| N/A - N/A | Not Applicable for this Inspection |
| N/A - N/A | Not Applicable for this Inspection |
| N/A - N/A | Not Applicable for this Inspection |

Notes:

Circumferential stress used for nozzles

Step 4:

- For shells and nozzles, calculate minimum required thickness (T-min) as per ASME Section VIII UG-27.
- For heads, calculate minimum required thickness (T-min) as per ASME Section VIII UG-32.

| Components | T-Min |
|-----------------------|-------|
| Top - Inlet Nozzle | 0.335 |
| Top - Head | 2.374 |
| - Shell | 1.162 |
| Bottom - Head | 2.374 |
| Bottom - Drain Nozzle | 0.303 |



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REPORT

Report #: **156960-MD-08**
Inspect Date: 10/16/2012
Page: 7 of 14
Insp. Co. Job #: 156960

Insp. Company: Matrix_Inspection LSD: 01-24-096-05W6 Jurisdiction #: A0146858

Thickness and Remaining Life Evaluation (Continued)

Step 5: Is any measured thickness less than calculated minimum required thickness (T-min)? **N/A**

*If YES, complete Step 6
If NO, proceed to Step 7..*

Step 6: Is nature and extent of pitting acceptable as per API 510? **N/A**

Step 7: Calculate Remaining Life as per API 510. How? (Find last reading; use nominal thickness if nothing available). Short Term Corrosion Rates and Long Term Corrosion Rates.

| Components | Remaining Life (Yrs) |
|-----------------------|----------------------|
| Top - Inlet Nozzle | 99 |
| Top - Head | 99 |
| - Shell | 99 |
| Bottom - Head | 99 |
| Bottom - Drain Nozzle | 99 |

Step 8: Contact CNRL Integrity Coordinator to discuss above results.

- Name of CNRL contact: Not Applicable for this Inspection
- Date and time of conversation: Not Applicable for this Inspection

Summary/results of conversation:
Not Applicable for this Inspection

Crack Evaluation by Magnetic Particle or Alternative Inspection “Must be Completed”

MUST BE COMPLETED AND RESOLVED WITH CNRL IMMEDIATELY UPON DISCOVERY OF CRACK-LIKE INDICATIONS

Were any indications found to suggest the vessel contained cracks? **N/A**

If NO, proceed to “CNRL Criticality Designation”.

If YES, Contact CNRL Integrity Coordinator to discuss results.

- Name of CNRL contact: Not Applicable for this Inspection
- Date and time of conversation: Not Applicable for this Inspection

Summary/results of conversation:
Not Applicable for this Inspection



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 Inspect Date: 10/16/2012
 Page: 8 of 14
 Insp. Co. Job #: 156960

Insp. Company: Matrix_Inspection LSD: 01-24-096-05W6 Jurisdiction #: A0146858

CNRL Criticality Evaluation – “MUST BE COMPLETED”

The CNRL In-Service Pressure Vessel Inspector MUST answer all the following questions

1. Is the vessel fit-for-service? : **Yes**
2. Was the measured thickness less than the calculated minimum required thickness (T-min) for any component?: **No**
3. Were MT indications found?: **N/A**
4. Was the remaining life less than 6 years for sour service vessels or less than 10 years for sweet service vessels?: **No**
5. Were NCR's or Action Items generated as a result of the inspection? : **Yes**
6. Were UT readings below (Nominal WT – Corrosion Allowance) found? : **No**

Information on CNRL Owner User Program - Criticality Designation and Required Review

RED – Vessel Inspection Results are deemed RED if one of the following occurred:

- The measured thickness was less than the calculated minimum required thickness (T-min) for any component.
- MT indications were found.
- The remaining life was calculated to be less than 6 years for sour-service vessels or less than 10 years for sweet-service vessels.

RED inspection reports must be signed off by the CNRL Chief Inspector.

YELLOW – Vessel Inspection Results are deemed YELLOW if one or more of the following occurred:

- The vessel was declared NOT fit-for-service by the 3rd Party In-Service PV Inspector.
- NCR's or Action Items were generated as a result of the inspection.
- UT readings below (Nominal WT – Corrosion Allowance) were found.

YELLOW inspection reports must be signed off by the CNRL Pressure Equipment Integrity Coordinator.

GREEN – Vessel Inspection Results are deemed GREEN if all of the following are true:

- The vessel was declared fit-for-service by the 3rd Party In-Service PV Inspector.
- UT readings below (Nominal WT – Corrosion Allowance) were NOT found.
- MT indications were NOT found.
- NCR's or Action Items were NOT generated as a result of the VE inspection.

GREEN inspection reports must be signed off by the 3rd Party In-Service Pressure Vessel Inspector.

Criticality Designation



Yellow

Vehicle #: 380 Kms: _____
 Time In: 00:00 Time Out: 00:00 Hrs _____
 Time In: 00:00 Time Out: 00:00 Hrs _____
 Personnel: SJ
 Billing Info: AFE :

Inspector (Name): Matthew B Dickinson PESL: 601
 Inspector (Signature): _____
Inspector Signature
06/30/2010 08:43:20 am
 API: 39483
 CNRL Coordinator (Name): _____
 CNRL Coordinator (Signature): _____
Coordinator Signature
09/30/2010 08:44:03 am
 CNRL Chief Inspector (Signature): _____
 (I am in full agreement with report contents)
Chief Inspector Signature
09/30/2010 08:45:29 am
 (I am in full agreement with report contents)

Equipment Photographs:



01 nameplate



02 broken rivet



03 overview



04 surface corrosion



05 scratched paint



06 damaged insulation



07 moss growth



08 mechanical damage on support



09 surface corrosion



10 mechanical damage on shell



11 not within range



12 caulking seal deterioration